Amendments to the Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

1. (Currently Amended) A satellite communication system, comprising:

a satellite earth station operably coupled to at least one data network; and

a plurality of satellite modems, each satellite modem of the plurality of satellite modems communicating in an upstream and a downstream data communication mode with the satellite earth station via at least one servicing satellite,

wherein the satellite earth station includes:

a host processor ~~for receiving~~ configured to receive data packets from the at least one data network and processing Data Over Cable Service Interface Specification (DOCSIS) management packets,

a DOCSIS Media Access Control (MAC) coupled to the host processor ~~for encrypting~~ configured to encrypt a transmit packet data from a host memory, ~~framing~~ to frame data in MAC headers, and ~~inserting~~ to insert MAC timestamps in the transmit packet data,

a satellite modulator coupled to the DOCSIS MAC ~~for modulating~~ configured to modulate an encrypted transmit packet data to generate downstream output data for transmission to at least one of the plurality of satellite modems, [[and]]

a burst demodulator coupled to the DOCSIS MAC configured to demodulate upstream input data to generate demodulated data, and

a turbo decoder coupled to the burst demodulator and the DOCSIS MAC ~~for decoding~~ configured to decode the demodulated data from the burst demodulator and ~~sending~~ to send decoded data to the DOCSIS MAC, wherein the DOCSIS MAC sends DOCSIS management packets portion of the decoded data to the host processor and sends transmit packet data portion of the decoded data to the at least one data network.

2. (Original) The satellite communication system of claim 1, wherein the data network is the Ethernet.

3. (Currently Amended) The satellite communication system of claim 1, further comprising:

an RS Decoder ~~for correcting~~ configured to correct errors of the decoded signal from the turbo decoder.

4. (Currently Amended) The satellite communication system of claim 1, wherein the DOCSIS MAC comprises:

a SPI controller ~~for supporting~~ configured to support a downstream channel and at least one upstream channel;

an encryption engine ~~for encrypting~~ configured to encrypt the downstream data;

a decryption engine ~~for decrypting~~ configured to decrypt the upstream data;

a formatter ~~for formatting~~ configured to format downstream data into Motion Picture Expert Group (MPEG) frames; and

a timing generator ~~for inserting~~ configured to insert DOCSIS time stamps at programmable intervals.

5. (Currently Amended) The satellite communication system of claim 1, wherein the burst demodulator comprises:

an analog front end (AFE) circuit for accepting configured to accept ~~an analog~~ the upstream input ~~signal~~ data and ~~generating~~ to generate a digital signal;

a digital filter coupled to the AFE circuit ~~for filtering~~ configured to filter the digital signal;

a quadrature amplitude (QAM) demodulator coupled to the digital filter [[for]] configured to word ~~detection~~ detect of programmable length and pattern in a burst preamble of the digital signal;

an adaptive equalizer coupled to the QAM demodulator ~~for characterizing~~ configured to characterize a RF channel response; and

a forward error correction (FEC) decoder coupled to the adaptive equalizer ~~for decoding~~ configured to decode [[of]] a FEC code.

6. (Currently Amended) The satellite communication system of claim 1, wherein the FEC decoder comprises:

a programmable de-scrambler;

a programmable reed-Solomon (RS) decoder;

a byte deinterleaver; and

a FEC interface circuit.

7. (Currently Amended) The satellite communication system of claim 5, wherein the adaptive equalizer includes an ~~Ingress~~ ingress cancellation circuit for canceling ingress noise and removing inter-symbol interference.

8. (Currently Amended) The satellite communication system of claim 5, further comprising:

a microcontroller for programming of the burst demodulator.

9. (Currently Amended) The satellite communication system of claim 5, further comprising:

a channel B input interface configured to accept a direct RF analog input.

10. (Currently Amended) The satellite communication system of claim 1, wherein the turbo decoder comprises:

dual analog-to-digital converters (ADCs) ~~for sampling~~ configured to sample a baseband IQ analog waveform to provide a sampled waveform;

a phase/frequency recovery circuit coupled to the dual ADCs ~~for recovering~~ configured to recover [[the]] a phase and a frequency of the sampled waveform to provide a recovered signal;

a variable demodulator ~~for demodulating~~ configured to demodulate the recovered signal to provide a demodulated signal;

a forward error correction (FEC) decoder coupled to the variable demodulator ~~for FEC decoding~~ configured to FEC decode [[of]] the ~~modulated~~ demodulated signal; and

a turbo decoding circuit coupled to the variable demodulator ~~for turbo decoding of~~ configured to turbo decode the ~~modulated~~ demodulated signal.

11. (Currently Amended) The satellite communication system of claim 10, wherein the turbo decoding circuit comprises:

a Viterbi decoder; [[,]]

a synchronization and ~~deinterleaver, and~~ deinterleaver; and

a reed-Solomon (RS) decoder.

12. (Currently Amended) The satellite communication system of claim 10, further comprising:

a microcontroller for system configuration, control, and monitoring functions.

13. (Currently Amended) The satellite communication system of claim 10, further comprising:

a downstream circuit coupled to the DOCSIS MAC ~~for reformatting~~ configured to reformat the encrypted transmit packet data into a byte-wide stream and forward the bytes to the satellite modulator.

14. - 17. (Cancelled)

18. (Currently Amended) A satellite earth station system for upstream and downstream data communication, comprising:

a host computer coupled to a data network ~~for receiving~~ configured to receive data packets from a data network and processing Data Over Cable Service Interface Specification (DOCSIS) management packets;

a demodulator/Media Access Control (MAC) card coupled to the host processor including:

a DOCSIS MAC coupled to the host computer ~~for encrypting~~ configured to encrypt transmit packet data from the data network responsive to processed DOCSIS management packets from the host computer,

a burst demodulator ~~for demodulating~~ configured to demodulate upstream data received from a satellite modem, and

a turbo decoder coupled to the burst demodulator and the DOCSIS MAC ~~for decoding~~ configured to decode the demodulated data from the burst demodulator and ~~sending~~ to send the decoded data to the DOCSIS MAC, wherein the DOCSIS MAC sends DOCSIS management packets portion of the decoded data to the host computer and sends transmit packet data portion of the decoded data to the data network; and

a satellite modulator coupled to the demodulator/MAC card ~~for modulating~~ configured to modulate the encrypted transmit packet data from the DOCSIS MAC to generate downstream output data for transmission to the satellite modem.

19. (Original) The satellite earth station system of claim 18, wherein the demodulator/MAC card is embodied in a pluggable circuit board card resident in a PCI chassis and the host computer is a personal computer (PC).

20. (Original) The satellite earth station system of claim 18, wherein the data network is the Ethernet.

21. (Original) The satellite earth station system of claim 19, wherein the DOCSIS MAC and the PC communicate via a PCI bus.

22. (New) The satellite earth station system of claim 18, further comprising:

a Reed-Solomon (RS) Decoder configured to correct errors of the decoded signal from the turbo decoder.

23. (New) The satellite earth station system of claim 18, wherein the DOCSIS MAC comprises:

a SPI controller configured to support a downstream channel and at least one upstream channel;

an encryption engine configured to encrypt the downstream data;

a decryption engine configured to decrypt the upstream data;

a formatter configured to format downstream data into Motion Picture Expert Group (MPEG) frames; and

a timing generator configured to insert DOCSIS time stamps at programmable intervals.

24. (New) The satellite earth station system of claim 18, wherein the burst demodulator comprises:

an analog front end (AFE) circuit for accepting configured to accept the upstream input data and to generate a digital signal;

a digital filter coupled to the AFE circuit configured to filter the digital signal;

a quadrature amplitude (QAM) demodulator coupled to the digital filter configured to word detect of programmable length and pattern in a burst preamble of the digital signal;

an adaptive equalizer coupled to the QAM demodulator configured to characterize a RF channel response; and

a forward error correction (FEC) decoder coupled to the adaptive equalizer configured to decode a FEC code.

25. (New) The satellite earth station system of claim 18, wherein the FEC decoder comprises:

a programmable de-scrambler;

a programmable reed-Solomon (RS) decoder;

a byte deinterleaver; and

a FEC interface circuit.

26. (New) The satellite earth station system of claim 24, wherein the adaptive equalizer includes an ingress cancellation circuit for canceling ingress noise and removing inter-symbol interference.

27. (New) The satellite earth station system of claim 18, wherein the turbo decoder comprises:

dual analog-to-digital converters (ADCs) configured to sample a baseband IQ analog waveform to provide a sampled waveform;

a phase/frequency recovery circuit coupled to the dual ADCs configured to recover a phase and a frequency of the sampled waveform to provide a recovered signal;

a variable demodulator configured to demodulate the recovered signal to provide a demodulated signal;

a forward error correction (FEC) decoder coupled to the variable demodulator configured to FEC decode the demodulated signal; and

a turbo decoding circuit coupled to the variable demodulator configured to turbo decode the demodulated signal.

28. (New) The satellite earth station system of claim 27, wherein the turbo decoding circuit comprises:

a Viterbi decoder;

a synchronization and deinterleaver; and

a Reed-Solomon (RS) decoder.